

GETTING TO THE ON-RAMP OF THE INFORMATION SUPERHIGHWAY

Clyde Hewitt

The Federal Acquisition Streamlining Act provides an additional incentive to program managers striving to achieve increases in the productivity of their staffs through paperless acquisition processes. Key elements in any transition to paperless acquisition are technology, process, environment, training, and operations. These elements are addressed in the context of the program office, seen here as the on-ramp to the information superhighway.

Program managers are facing a new challenge in this era of downsized government: maintaining high levels of service to the customer by increasing the productivity of the program office itself. Changes to the acquisition process alone have not gone far enough to raise staff productivity. Increasingly, program managers must turn to technology to help solve their dilemma.

The new, automated paradigm of the traditional program office offers higher levels of productivity, yet it will fail to meet this goal without careful planning and an investment of resources and people. Properly executed, the transition to a paperless office should result in productivity increases that will outweigh the initial investment cost as well

as the continuing costs of operations and support.

In addition, the Federal Acquisition Streamlining Act (FASA) provides a real incentive for program managers to move toward the paperless environment. FASA raises the ceiling for purchases allowed under the government's less onerous small purchase rules from \$25,000 to \$100,000. However, the Act also places a lower, interim threshold of \$50,000 on the use of these rules by federal agencies, premised on whether the agencies can verify that they are performing 75 percent of their contracting actions using the electronic environment. Given that 77 percent of government contracting actions fall above this threshold in the \$50-100,000 range, the 'carrot' here couldn't be made more

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obvious.

FASA also supports the goal of reinventing government recommended by the National Performance Review. The Act requires the Office of Federal Procurement Policy to implement a government-wide Federal Acquisition Computer Network (FACNET) to promulgate the government's needs, receive solicitations, and provide public notice of contract awards. This totally electronic medium should greatly reduce the amount of paperwork required to order goods and services.

WHAT IS PAPERLESS ACQUISITION?

Paperless Acquisition encompasses the ability to identify needs, obtain appropriate approval authority, and assemble the documentation required to support the acquisition—usually in the form of a Request for Quote or Request for Proposal. It also promulgates needs to prospective vendors using EC/EDI or other electronic media, and gives prospective vendors the ability to respond electronically with proposals. Finally, it includes contract monitoring and the billing and payment process.

This all-inclusive vision of paperless acquisition is difficult to implement simultaneously. The current process involves too many players with dissimilar systems. A plan must be developed with

integrated but limited steps built upon previous accomplishments, each supporting the final goal. This planning should start at the on-ramp to the information superhighway: the program office.

The typical program office has a mixture of automation technologies. It typically does not have established processes for managing information using automation. With the implementation of EC/EDI, program managers may now take advantage of the existing and readily available technology to increase program office productivity.

Automating an office also requires a management approach that embraces thinking 'out of the box' of the traditional paradigm. A successful transition toward a paperless environment requires equal effort by managers in five functional areas: technology, process, environment, training, and operations.

THE TECHNOLOGY

The basic requirements for a paperless environment include an accessible storage location for information, a medium for information transfer, and a man-machine interface to translate the electronic information, such as a computer or printer.

Personal computers have replaced mainframe systems with remote termi-

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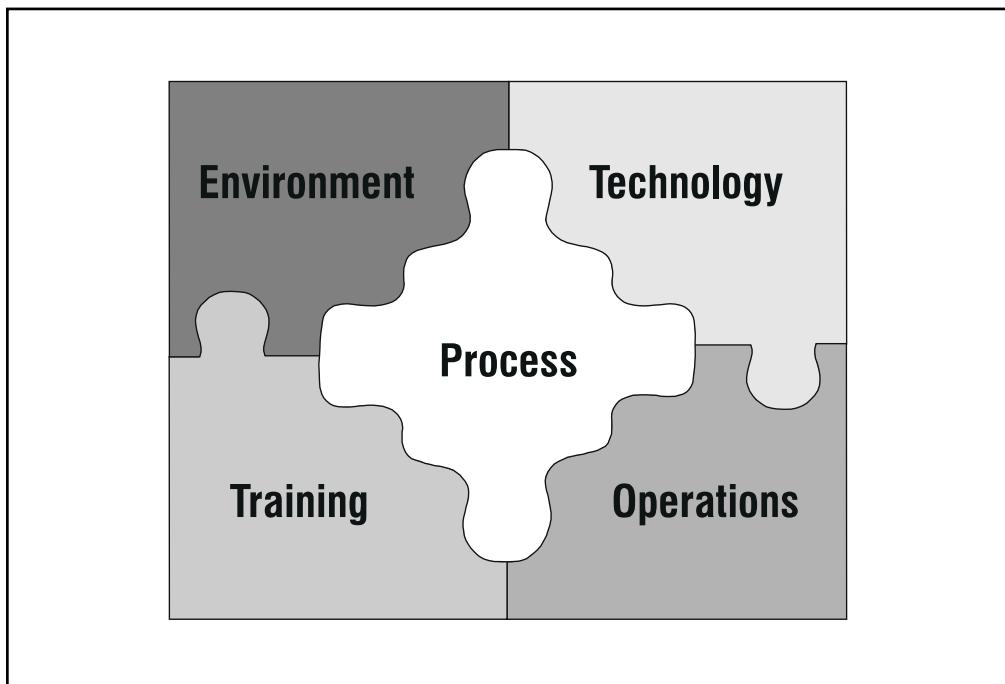


Figure 1. Elements for a Successful Paperless Acquisition Environment

nals as the most common man-machine interface, and have become the primary instrument of productivity for office workers. It's worth noting that an average performer may achieve a 10 percent gain in productivity by using a very fast computer instead of a slower machine. This performance increase would be worth \$5,000 in the case of a typical knowledge worker earning \$50,000 annually.

However, the backbone of the paperless office is the transfer of information, in electronic format, between workers using one of several media. Although the current medium of choice is the Local Area Network (LAN), it is not required for a paperless environment. Other methods include physically transferring floppy disks between ma-

chines and installing direct connections (e.g., dial-up bulletin board systems).

Today's work environment also extends beyond the office. Integrated Product Teams, or IPTs, may be geographically separated across a base or across the country. Portable computers accommodate this situation by expanding the electronic acquisition environment. These devices, when used with affordable high-speed modems and software that provide the same access to all users, extend the workplace throughout the world.

The LAN Outer Network (LON) offers users remote access to file servers and other services at nearly the same speed as a LAN. A recent Gartner Group study also found that productivity rose an average of 10 to 16 percent

as LONs came into use. Forrester Research estimates that there will be 22 million LAN users and 4 million LON users in the United States this year (Inc., 1994).

Regarding an accessible storage location for information, the key word is

This process eliminates the misunderstandings between the information source and the author.

‘accessible’ because it implies that workers have timely access to the information they need.

The cost-effective solution for organizations larger than five people is a file server. Even though it is possible for larger organizations to use floppy disks to store information, the productivity lost in searching for and transferring information between machines quickly justifies the purchase of a file server.

THE PROCESS

Many organizations, both in the commercial sector and in government, attempt productivity advancements through investment in technology without examining the basic interoffice communications processes. Senior leadership is left questioning the value of new technology following marginal increases in productivity. If the ‘paper process’ is broken before technology insertion, the ‘paperless process’ will also be broken.

Examination of the interoffice communications process identifies three basic elements of the documentation process: information creation, coordination, and configuration control. Just

as all optimized processes have only one owner, a single document owner, responsible for both the accuracy and dissemination of the information, is best empowered to manage the documentation processes. This single focal point avoids problems caused by having multiple revisions simultaneously circulating throughout program offices. Delegation of release authority to the owner is not required for process efficiency.

The document owner can choose between the centralized or the distributed document creation methodology. The centralized process, characterized by the document owner assimilating information from various sources, and then drafting a document, requires more time for a large document than the distributed process because of the coordination cycle with interested parties.

The decentralized document creation process is characterized by the document owner assigning writing requirements to various authors, and then serving as editor to ensure the final product is complete and consistent. This more difficult process requires detailed preparation since the owner must outline the requirements and expectations for each of the sections to each of the authors. This process eliminates the misunderstandings between the information source and the author. They become one and the same.

A carefully orchestrated document will also pass through the review and coordination cycle faster because each of the authors have a vested interest in its accuracy. As the document is completed, each section’s successive draft can be reviewed to verify that there are

no disconnects or conflicting information in the overall document. The document's owner becomes a team leader, and serves as the final editor to ensure consistency and accuracy prior to release.

Once the documentation is completed, it should be coordinated both within and outside of the program office. The document owner may elect to use the serial or shotgun coordination method. The electronic serial coordination method has several inconspicuous time-saving techniques, when used with a process-focused coordination cycle. As the document progresses through the coordination cycle, each successive reviewer imbeds their comments directly into the document with full visibility of the prior reviewers' suggested changes.

The leading word processing packages, such as Microsoft Word for Windows, have an option of locking the original document and only allowing each successive reviewer the option of imbedding annotations. This method protects the original ideas from modifications while permitting the owner to easily review comments.

Reviewers using the latest version of Microsoft's Word For Windows have the option of making direct changes to the original document. The revisions can be preserved for review by the document owner by the use of color coded 'revision marks.' The document owner has the option of quickly scanning through the document, accepting or rejecting individual changes by simply the click of the mouse. If used properly, this methodology optimizes the coordination and correction process.

'Now WHERE DID I PUT THAT?'

The personal computer has been a part of the acquisition environment for over a decade. With its introduction came the ability to individually customize computers according to personal preference. This personal freedom has also served as a barrier to productivity gains. There was a quiet revolution when personal computers were connected with LANs. No longer a collection of personal computers, but a 'system,' they must be managed using a 'systems approach' in order to realize their productivity potential.

With the expected growth in the number of electronic documents, program offices must adopt a storage and retrieval methodology in order to provide users universal access to documents (GSA, 1995). There are several different proprietary technological solutions that provide indexing and rapid text search capabilities. However, most government program offices can satisfy the majority of their document storage requirements without handcuffing themselves to a vendor. The use of a non-proprietary overall storage strategy provides an unobstructed upgrade path as vendors and software products evolve.

There are a few common sense rules to electronic filing. First, there should only be one accessible copy of the document (excluding backups) available for review and coordination. It should be kept in a central location, such as a file server, which can be accessed from any

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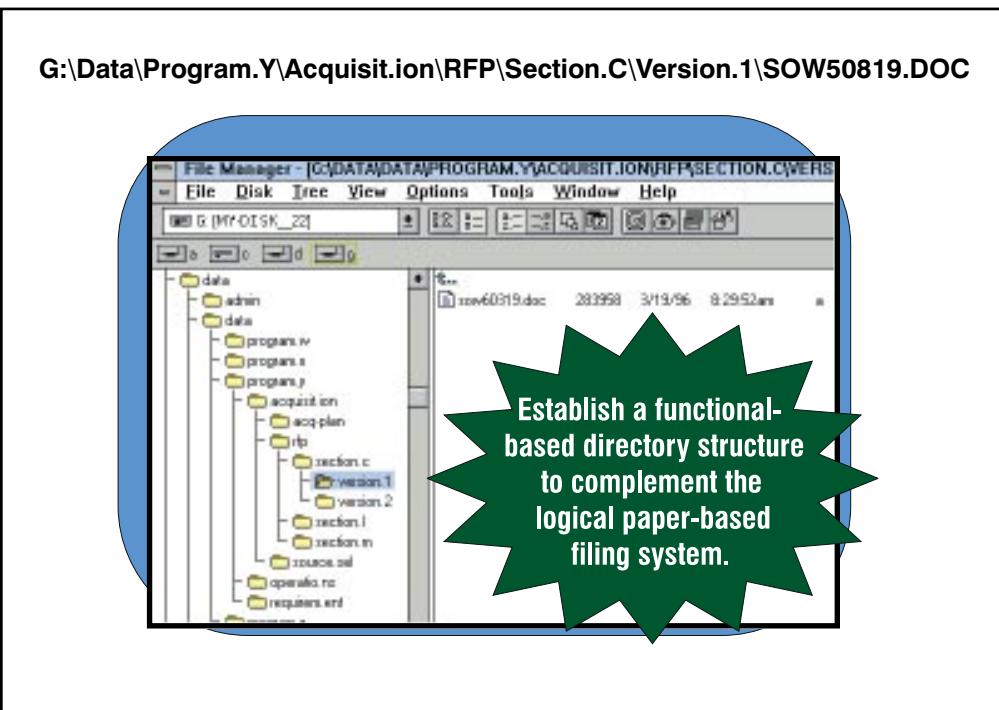


Figure 2. Establish a functional-based directory structure to compliment the logical paper-based filing system.

computer by an authorized user. Multiple copies of single document exacerbates the configuration control problem for the document owner by increasing the risk of losing comments generated in the coordination process.

The second rule is that the electronic filing system should match the schema of the office's paper system. Documents should be stored first by the users' access requirement, and second, by subject matter. This is the same procedure used in most paper environments. This schema is necessary to implement controllable and manageable security procedures.

Organizing files by subject matter is a difficult part of the automation process. Some organizations chose to or-

ganize files by the software application used to create a document (e.g., documents, briefing slides, or spreadsheets). This approach is not recommended since users naturally think in terms of subject matter, not application program, when searching for information. A second user searching for a document may not know which software application the document's creator selected; the process of locating information becomes a fishing trip through the file server. With the emergence of integrated multi-functional software applications, it is now possible to create a table of information in a word processor, database, spreadsheet, or presentation package. This will further make application-centered filing systems dys-

functional.

The nested directory approach is the easiest non-proprietary method for quick access to documents. For the MS-DOS and Windows users, the sub-directory structure expands to many levels providing ordered, logical storage locations. For the Macintosh users, nested folders provide the same functionality. Nested sub-directories, when set up properly, guide users in a logical direction to the desired document. One Air Force program office successfully used a nested structure to create and coordinate a large Request for Proposal in a paperless environment. New program office staff members quickly recognized the contents of the 'G:\DATA\ACQUISIT.ION\RFP\SOW\VERSION1\' directory, even without examining individual files.

After identifying the proper directory, the user must identify the correct document. Since a program office of 30 people can generate over a thousand files annually, a document naming convention permits quick file identification by other staff members. This convention should be tailored to the advantages of the computer environment. The DOS-Windows users face a limitation of 11 characters—eight + three. Macintosh and Windows 95 users don't face the same limitation. On networks with a mixture of systems, *all* users should follow the more restrictive schema to permit file access across platforms.

A file naming convention, when used with a detailed directory structure, can simplify information access without the need of additional technology. This process-centered solution can be tai-

lored and grow as an organization's needs evolve. Some high technology solutions, such as some of the proprietary integrated scanner-storage systems, could lock a program office into a system that cannot be accessed in the future. Documents stored using these systems may not be accessible as standards evolve and the system is eventually replaced.

In summary, the electronic document creation and coordination process saves time and dollars. In the single-user environment, there are myriad ways in which a person may satisfy his or her own requirements. In a group environment where access, configuration control, and coordination are required, managers must establish a process that promotes a user friendly system. This requires the same forethought, effort, and teamwork that underlies the paper-filled filing cabinet.

ELECTRONIC MAIL PROCESS

Electronic mail, or e-mail, stands to revolutionize the communications process much the same as the telephone did in the late 19th century. E-mail permits communications across the fourth dimension (time) in virtually a ubiquitous state. Users will never experience a busy signal when trying to contact someone through e-mail. E-mail has two other desirable features: the capability to store information until the recipient is available, and the capability to serve as a record, permitting review and retransmittal if necessary.

E-mail can reduce the amount of time required to communicate informa-

tion when used to broadcast information to several individuals simultaneously. The use of mailing lists or bulletin boards facilitates convenient communication among several people, eliminating unnecessary meetings.

Since e-mail's infancy, it has evolved into an efficient, rapid communication system, capable of replacing most of the traditional 'snail-mail.' The next major revolution in e-mail, mass communications, is starting to emerge. The informal processes used in the past to control and prioritize information must be formalized to make effective use of the next generation of e-mail systems.

As e-mail use continues to grow, so does the users' distaste for the 'junk mail' that grows with it. Workers are drowning in data while searching for information. Many program managers receive more than 50 messages daily. There is a growing requirement to quickly identify the important mail, and eliminate the 'chaff.' Intelligence and Command and Control systems are starting to employ the use of Automated Message Handling (AMH) systems. This time-saving technology has been recently introduced into the commercial market, but users must follow more rigid processes to maximize the potential productivity. One of the better products for a LAN is 'beyond mail' which provides several nested layers of AMH, allowing customization at the group and individual level. With simple customization, the end user can have the software 'read' the message and take different actions depending on rules established by the user. As an example, the program manager may elect to automatically forward all incoming

e-mail from selected senders to his deputy.

It is not necessary to have an AMH installed if users establish a process to quickly identify the important and routine messages. Most e-mail systems have an inbox which sorts unread e-mail and displays part or all of the 'subject' line. If all users preface the subject with a key word, then manual identification of important messages becomes a natural part of reading the mail. The key word should be short and standard across the organization. This manual categorization of messages simplifies any future AMH installation, and permits automatic sorting and filing.

At a loss for key words? Try the following:

HOT: for the most important messages

ACTION: for a tasking message

SUSP (date): for a message containing a suspense

MSG: for an outside message

CALL: for a telephone message

MTG: for a meeting notification

RFI: for a formal 'Request For Information'

???: for an informal 'Question'

INFO: for all routine, non-tasking e-mail messages

FYI: for all 'unofficial' For Your In-

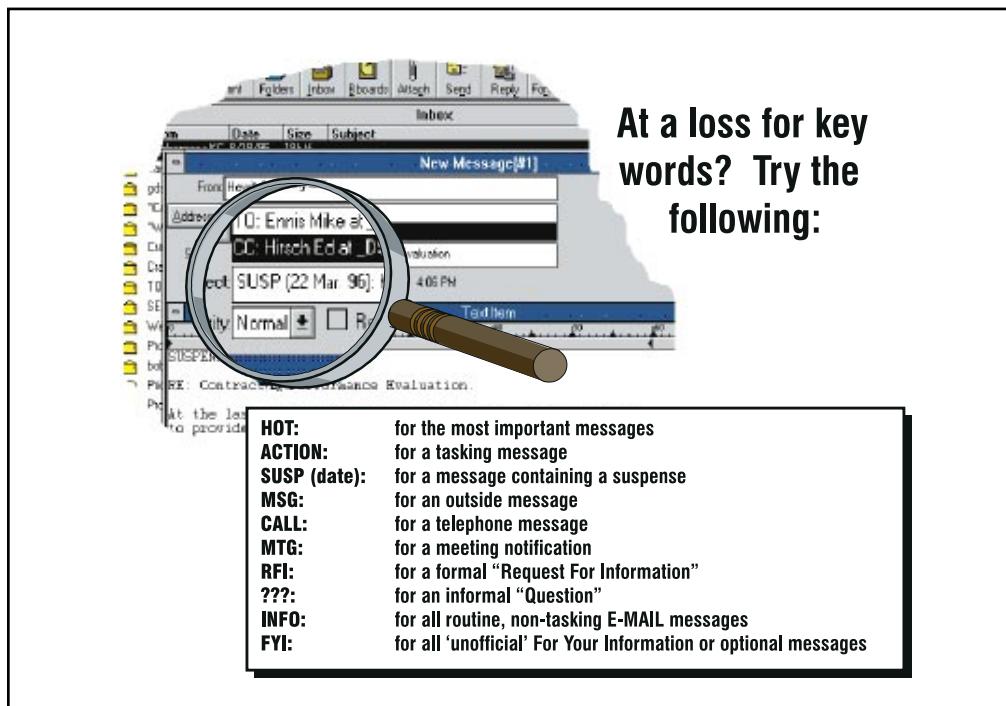


Figure 3. Key Word Samples

formation, or optional messages

E-mail should also be 'sender friendly.' Some progressive organizations have recognized the fact that there can't be two hundred 'BOB@COM' users. Until the Internet has matured to provide a reliable directory service, make addressing e-mail a simple event. First, establish an e-mail naming convention which takes advantage of the services available today. Since most e-mail systems have an automatic sort function, always start your e-mail address with your last name, followed by your first name or initials. Finally, every organization should have a common mailbox, published to the world, which serves as the single entry point for offi-

cial message traffic. In the event someone transfers, or is unavailable for an extended period of time, this 'clearinghouse' serves as a trap to prevent any important messages from ending up in the 'electronic dead letter file.'

THE ENVIRONMENT

Information technology is a tool that must be purchased, properly used, and maintained in order for the workers to benefit from its potential to increase productivity. Just as there are incentives for contractors to invest in modern tooling under the assumption that it increases manufacturing productivity, so too are there incentives for investments

in the program office's information technology.

Program managers have an obligation to increase their staff's productivity. The senior leadership, including President Clinton and Ms. Preston, the Assistant Secretary of Defense for Acquisition Reform, has established the requirement that we change the way we are doing business.

A recent study, commissioned by the Air Force Materiel Command, examined why acquisition organizations were successful at integrating information technology. A common thread found among the best organizations was the presence of a champion. This individual, usually at the mid-to-senior level of management, spearheaded the information technology push. The champion usually held the vision of the paperless environment and fought for resources to make the investment (AFMC/XR, 1994).

It is, however, possible for a program office to integrate technology without a champion. Process Action Teams, Quality Circles, and other informal

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despite their best plans, however, teams cannot be effective without the commitment of senior management. Senior management must make the necessary investments in technology and, as importantly, allow the organization itself to evolve.

Evolution, after all, is certain: the

government continues to 'downsize' itself. Yet a focus on automation as merely another means of eliminating jobs will inhibit teamwork and, ironically, slow the introduction of information technology. The primary goal should be to increase office productivity through process re-engineering.

PEOPLE ARE NOT AFRAID OF CHANGE, THEY ARE AFRAID OF BEING CHANGED

How do you start the process of change? The introduction of information technologies can be met with resistance at all levels if planning is not performed first. Management should invest in employee training and develop automated processes to avoid technology shock. Many leading authors on process re-engineering stress that the key to successful change is in removing barriers that prevent people from changing. They have concluded that if you try to change people without removing their resistance to change, each successive positive factor will be met with an equally forceful excuse (Investors Business Daily, 1995).

groups can provide the direction and leadership to move an office into the paperless environment. De-

One key to the acceptance of change lies in the principle that change is a neutral event, inherently neither good nor bad. People respond positively or negatively to change based on their perceptions of how it will affect them and their coworkers. If management's focus is on stressing the positive aspects of change while eliminating any negative outcomes, change will be accepted naturally.

THE ROADMAP

There are no silver bullets guaranteeing the successful insertion of technology. Nevertheless, there are groups of supporting ideas, linked by a common thread, that can be tailored to each organization's unique circumstances. Each area must be addressed; ill-considered actions or beliefs will undermine the technology insertion effort.

First, there will be an initial period of turmoil and growing pains which senior management should anticipate. One way to help sustain an organization during this dislocation is to highlight each small success, while continuing to emphasize the future benefits. Remind people that they are on the 'bleeding edge of technology,' and that the investment will be worth the short-term drawbacks.

Second, support the champions for their vision and leadership during this initial period, because the office 'naysayers' will feast during the early days (Rose, 1995). Management and the champions should establish mentors who can address problems quickly before they spin out of control.

Finally, network with other users who have identified the negative aspects of the technology being implemented and have turned these liabilities into assets. Other program offices who have implemented paperless acquisition processes identify the following barriers they've had to overcome: poor system performance, less than universal availability, lack of established communications processes, too much individual freedom of choice, and undesirable interpersonal issues. These

barriers may be addressed as follows:

Poor system performance: One of information technology's greatest assets is its ability to keep up with a staffs' ability to create. Personal computers equipped with modern software packages indisputably increase users' productivity. The degree of productivity gained is in direct proportion to the amount of use the system gets. When users accept and use technology, productivity will also be maximized.

One major obstacle to the use of technology is poor system performance. Workers typically seek the most convenient method of performing their tasks. Unfortunately, an individual's search for what is personally the quickest or easiest method may often result in one that is less than optimal for a group.

...what is personally the quickest or easiest method may often result in one that is less than optimal for a group. True, the use of technology can change the traditional office paradigm, but only if it has been prepared to support the actual workload (in other words, only if it's less trouble than it's worth). Technology incapable of supporting the demands of a modern office will lead to improvisation by the workers, not infrequently in favor of paper, rather than electronic, processes.

As an example of a system that works, electronic phone message systems have now evolved to a point where they can reach the recipient anywhere at any time, with greater speed and accuracy than the pencil and paper method they replace. The CaLANDar

software package, for one, includes the ability to automatically tie into an electronic 'Rolodex' function with the click of a mouse, reducing potentially misunderstood or improperly copied phone messages. The software also has a feature that can automatically page the person being called. Once the message has been read, the product also provides an auto-dial and re-dial function to speed up the process of returning calls.

It's also worth noting that the \$1000 difference in price between a marginal and a high-end system can be justified by a .5% increase in productivity over the computer's three years of use. In fact, the virtual elimination of the hour-glass icon from the screen may increase worker productivity many times above the payback point.

Universal availability: E-mail serves as one of the best communications bridges to reach people away from the

office, permitting round the clock access to information. When coupled with the automatic-pager function, users

can be notified that an important e-mail is waiting for them. Part and parcel of this is the notebook computer, which must be compact and yet capable of interfacing easily with systems at the home office.

No communications process: Workers suffer less from the lack of information than they suffer from data over-

load. The sources of information are endless: electronic mail, electronic bulletin boards with multiple folders, even internal radio or television networks. All compete for our attention. This layering of communications media, in a misguided attempt to ensure each worker is reached, may well have the opposite effect: Redundancy can quash interest not only in the message, but in the medium as well. It is necessary to partition information into categories and use the one or two media necessary to reach the maximum number of members. The partitioning process should prevent the same information from reaching a single individual several times.

Freedom of Choice: This is probably the most controversial issue facing the introduction of information technology. Over 20 percent of the households in the U.S. now have computers. It is natural to want the same hardware and software suite at home as at work, but it causes major problems in a group environment. The least expensive investment to automate an office is the hardware and software. Different software and hardware suites add complexity to a LAN environment, require additional support staff (a big expense), and increased training requirements. While the previous items can be quantified, the biggest expense is, like an iceberg, below the surface.

Interoperability and immediate access of information in a paperless environment are two attributes that distinguish a single user from a group computing environment. An office with dissimilar hardware and software suites

...individual freedom...is also the main barrier to any productivity gains made possible by Local Area Networks.

can be glued together with modern tools. Unfortunately, the individual files retain the format of the creating software application. As an example, the two leading word processing software packages used in DoD are Novell's Word Perfect and Microsoft's Word for Windows, either of which is capable of translating the others' files. Unfortunately, the hidden cost of using two or more packages is the non-value added conversion time and the loss of unique editing features desired for group editing. The delays caused by conversion and the configuration control problem caused by multiple files stored in different formats also add no value. Finally, the presence of redundant software packages within an organization may limit the mobility of workers who aren't 'bilingual' or unnecessarily increase the cost of their training.

The individual freedom that came with the introduction of the personal computer is also the main barrier to any productivity gains made possible by Local Area Networks. No longer merely an assortment of 'stand alone' machines, personal computers are now part of an integrated system that must be managed like one.

Interpersonal Issues: Before the introduction of LANs, workers typically prepared and completed projects independently. The integrated program office now works in a spirit of teamwork, and the work ethic of teams is reinforced by network technology. One's work, even in draft form, is exposed for the consideration of other team members. By adding this deeper level of visibility, network technology also pro-

vides management, at least potentially, with a closer accounting of each individual's work effort. Understandably, this may cause anxiety (and resistance) among workers unaccustomed to getting 'in-process feedback.' Caution is advisable in structuring such feedback so that it will be accepted as 'process improvement' rather than being rejected as personal criticism (Sharon, 1995).

Resistance to technology may also arise from the fear that hard-won human contacts may be turned into faceless e-mail addressees. A recent Gallup poll discovered that over a third of white collar respondents didn't use computers for fear of losing face-to-face contact with associates (Miami Herald, 1995). They also feared their loss of privacy. Technology should not be viewed as a replacement for face-to-face contacts, but rather a medium to increase the total contacts between individuals.

Although the telephone took several decades to achieve universal acceptance, the computer revolution is proceeding much more rapidly as the technology becomes increasingly available, reliable, and inexpensive.

THE OPERATIONS

An established paperless office environment requires continuous care and feeding or entropy will slowly force it back toward the paper-filled world. The care and feeding of a paperless system requires both a vision and effort. It also requires a constant source of funding. Properly administered auto-



Figure 4. Office Automation Is A Process

mation systems rely upon a plan that levels the upgrade requirements across several years so that system upgrades happen as part of a process. Remember this key concept: Office automation is a process and not an event!

In the early days of personal computers, when the 80286 computer was just gaining acceptance in government, users felt that this computer would satisfy their needs forever. Today, users are aware that technology is growing at a frantic pace. Modern hardware and software tools are increasing the pace of productivity improvements. It was only four years ago that universally available automated performance reports didn't exist, but after implementation, one can only wonder how we could have done the job without them.

For the same price, personal computers are doubling their power approximately every 18 months. Organizations should attempt to keep everyone within two generations of technology to minimize support and performance impacts across a network. Failure to keep pace with technology results in having computers connected to a LAN that cannot support the latest generation of office automation software. A technological catch up requires a large influx of capital and effort, but not without the cost of political capital.

Organizations should budget replacing each personal computer in your organization every three years. The easiest way to level the budget is to replace one third of your computers each year, all for only \$750 per person per year.

Adoption of a standard software configuration simplifies the insertion of new machines, since ‘power users’ will get the newest machines, flowing down the less powerful machines to less demanding users. After the third year, it may be necessary to replace only the computers, and not the monitors, further reducing the annual upgrade cost.

If an organization has not established an office automation process, and is temporarily forced to use older, less capable computers, then it becomes necessary to match the software and hardware capability to the slowest platform. It is wiser to keep an older version of software longer than planned if it still performs the function. Organizations should avoid the temptation to install the latest version of a software application before all computers are capable of providing satisfactory performance, so that they don’t end up with a situation where the older machines fail to perform and thus frustrate users. In this case, the users may revert to the older software version to regain performance, compounding problems since documents created with different versions of the same software increase the configuration control nightmare.

As an example, one Air Force installation elected to retain an older version of word processing software for almost a year after a newer version was released. Their evaluation determined that the newer version of software didn’t perform adequately on their older 386-based hardware platforms. They waited until a larger portion of the base had upgraded to newer 486-generation personal computers. In this instance, a prudent regard for organi-

zational standardization necessitated keeping an older version of software longer than some users wanted. In the end, it was the best decision.

Since the operations function is a service function, customer focus should prevail when establishing operations policy. There are internal and external customers in a

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paperless environment. The external customers are the individuals who expect correct information on time. The internal customers expect computer systems available when they need them, with the tools and training necessary to optimize their performance. There are several processes necessary to perform these functions.

The paperless environment, just as other processes within an organization, require a process owner. This process owner should be responsible for the operation and support of the entire paperless environment, not just the hardware and software. Depending on the size of an office, the position can either be full or part time. It is counterproductive to have several sub-process owners who are fragmented throughout the organization since a coordinated approach to a paperless environment is required to keep the system operating efficiently.

After identifying the process owner, we turn to managing the processes. The first process is the routine operation of the network, usually managed by a network manager or LAN administrator. The responsibilities of the network or LAN manager include establishing and

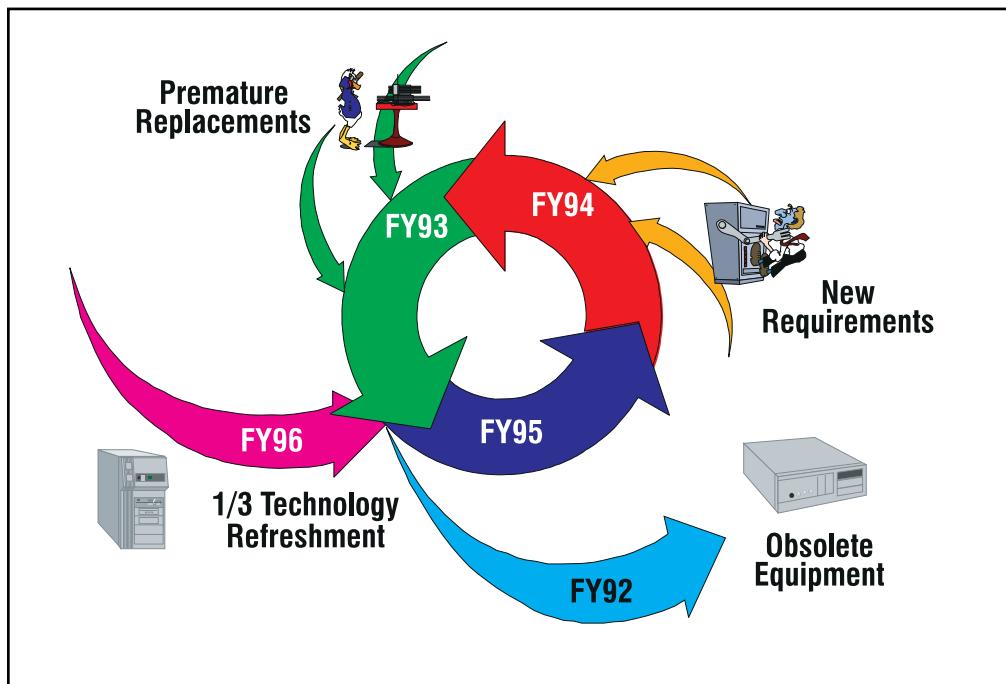


Figure 5. Computer Acquisition Requirements

maintaining user accounts, performing daily backups of the data, and conducting periodic virus sweeps to ensure data integrity. These functions are critical to maintaining the network and, by extension, to keeping the larger organization on track to the extent that it relies on the network. The position of LAN manager is a key one.

Unfortunately, LAN administrators are typically under-trained, partially because of the relative infancy of the career field and also due to the complexity of LANs (Rose, 1995). The best administrators are very pro-active, not only performing system backups, but monitoring system performance, performing virus scans, and making process corrections to maintain high performance. Examples of pro-activity in-

clude monitoring data files, transferring older files to a backup storage device when no longer needed, and making recommendations on when to upgrade hardware and software based on individual user's work profiles.

The best administrators recognize that they are part of a service organization, and that keeping the LAN available and functioning during peak work hours is essential to good customer relations. Scheduling LAN or file server maintenance on a Monday morning or a Friday afternoon, when the users are busy getting ready to depart to or getting back from trips, inhibits access to mail and files. This practice would naturally be eliminated in customer-focused operations centers.

A recent CompuServe survey re-

ported that half of the respondents had LAN outages of at least one hour a week, costing the companies a minimum of \$500 an hour. Another Gallup survey showed that an average corporate LAN goes down 27 times a year, costing it's owners almost \$3.5 million in lost productivity. (CompuServe Magazine, 1994) These costs should be considered when scheduling system backups during normal working hours. Complete system backups are best performed after hours, and always just before a hardware or software upgrade.

The best performances are not limited to LAN. If all notebook computers in the office pool are configured exactly the same, users don't have to go searching for applications, regardless of the notebook that is checked out. These notebooks should also have pre-loaded information to simplify the dial back procedure.

The valuable LAN administrator resources should not be limited to the functions listed above. Another sub-function of LAN administration process is the test and installation of software and hardware upgrades. 'Test' must precede 'installation!' Some organizations perform tests after installation, and risk losing data, or the LAN, and creating unhappy users. The acquisition community doesn't normally field untested weapon systems, and it shouldn't accept untested office automation systems.

A final sub-function of LAN administration is the installation and repair process. The Wall Street Journal recently reported that large organizations' operations budgets are almost \$4,000 annually per personal computer.

This expense is roughly divided up among the cost of the support personnel, system downtime, and system spares (Forrester Research, 1995). Since this number is almost twice the average cost of a quality computer, attempting to save funds by purchasing a less than quality system is not cost effective in the long term.

THE TRAINING

It's been said that if the cost of training seems expensive, one should consider the cost of ignorance. Although managers are, of course, free to select either informal or formal training as they prefer, there is little doubt that informal training will be more expensive in the end.

Program office workers require training in the technology adopted for use and, as importantly, in the organization's communications processes.

It is fairly easy to train users to use technology, given the multitude of available methods. These range from the formal classroom session to the use of several commercial videotapes and workbooks. These resources seem relatively inexpensive when one divides the purchase cost by the number of workers to be trained.

...an average corporate LAN goes down 27 times a year, costing it's owners almost \$3.5 million...

Training workers about an organization's communications process is more difficult. The first requirement, after establishing standards, is to docu-



Figure 6.

ment and baseline the process so that it can be promulgated throughout the organization. This task is difficult because of the desire to evolve the processes through continuous improvement. Once the processes are baselined, the users can be trained on the process. Finally, the process owner should conduct periodic inspections to ensure that the processes are being followed.

There are several techniques that encourage the use of standard processes. Leveraging individual creativity identifies time saving methods that can be exploited through technology. Templates within software applications, easily accessible to each user by 'hot keys' or 'macros,' reduce the time required to perform many basic functions, such

as FAX Forms, pre-formatted official memorandums, and signature blocks.

System administrators also require specialized training in LAN and wide area net operations to ensure the system performs well. Organizations should not attempt to underinvest here. And system administrators must be knowledgeable in the operations of their organizations. They should know who needs access to the different types of information and where it is normally kept. This individual has the responsibility of designing a physical computer architecture and a functional allocation of computer disk space to satisfy the needs of the customer. Senior managers are challenged to serve as a mentor to their System Administrators and keep them informed of the

organization's information needs.

The acquisition community is entering a period of rapid change, and the pace of change is getting faster. There is an opportunity to fundamentally alter the way the acquisition community conducts business. This opportunity is fueled partially by technology, and partially by changing attitudes in the government. The signing of FASA has ushered in not only an era of acceptance to change the way we do our business, but a mandate to change.

In summary, program managers have a requirement to enter the electronic age. This task should be approached with at least the same attention to detail as is applied to the other acquisition programs. The acquisition community must resist narrowing the focus on the technical solution and instead invest in processes that the basic technology supports. If an organization's basic communications process are chaotic before automation, the existing inefficiencies will only occur faster after automation.

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